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CONCEPTS AND SKILLS

- Magnetic fields
- Law of universal gravitation placement



**Y**ou cannot see electric energy, but the electric eel in the photograph can. It is not really an eel — it is actually a knife fish, or *Electrophorus electricus* — but it *is* electric. This fish can detect and generate an electric potential difference. Nearly half of the knife fish’s body consists of specialized muscle cells that function like a series of electric cells. This living “battery” can generate an electric potential difference of up to 600 V. The electric shock caused by the knife fish can kill some small prey and often stuns large prey, which the knife fish then devours.

The pits along the side of the knife fish’s head and body, called the “lateral line system,” are specialized to detect electric fields. The knife fish uses its ability to generate and detect electric energy to navigate, detect enemies, kill or stun prey, and possibly even communicate with other knife fish. If water is polluted, it modifies the electric field generated by the knife fish. A university in France is studying the possibility of using the knife fish to monitor water quality. As you can see, there are even some areas of research in biology that require a basic understanding of physics.

In this chapter, you will learn more about electric energy and fields and compare them with gravitational and magnetic energy and fields.